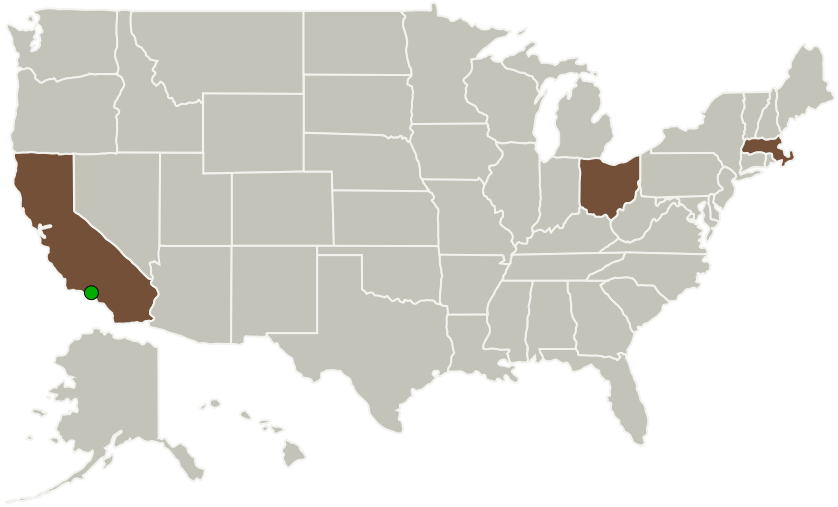
Novel Near-to-Mid IR Imaging Sensors Without Cooling, Phase I

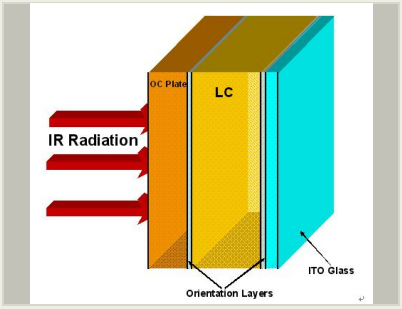
Completed Technology Project (2013 - 2014)

Project Introduction

Boston Applied Technologies, Inc (BATi), together with Kent State University (KSU), proposes to develop a high sensitivity infrared (IR) imaging sensor without cooling, which covers a broad band from near infrared (NIR) to mid-infrared (mid-IR). It is based on a specific transparent functional material developed at BATi that has excellent pyroelectric effect, over strong absorption at NIR, mid-IR and long-wave infrared (LWIR) wavebands, perfect transmittance in visible wavelength. With this material, the intensity variation of an incident NIR, Mid-IR or/and LWIR radiation from a warm object can be transferred into intensity variation of a visible beam by a smart use of liquid crystal, which can be detected by a commercial CCD or CMOS camera. Of the most important, the collaboration with Dr. Quan Li's group at The Glenn H. Brown Liquid Crystal Institute at KSU, which is renowned for their pioneer research and development on liquid crystal, will further leverage and ensure the success of the proposed program. Compared to existing thermal imaging techniques, this invention will generate an uncooled IR imaging sensor with unprecedented low costs, high resolution, high sensitivity, low mass, and low power consumption, which is very important to NASA's planetary exploration projects and other applications.

Primary U.S. Work Locations and Key Partners





Novel near-to-mid IR imaging sensors without cooling Project Image

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Organizations Performing Work	Role	Type	Location
Boston Applied Technologies, Inc.	Lead Organization	Industry Minority-Owned Business	Woburn, Massachusetts
Jet Propulsion Laboratory(JPL)	Supporting Organization	NASA Center	Pasadena, California
Kent State University at Kent	Supporting Organization	Academia	Kent, Ohio

Primary U.S. Work Locations	
California	Massachusetts
Ohio	

Project Transitions

May 2013: Project Start

May 2014: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/138378)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Boston Applied Technologies, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Hongzhi Zhao

Co-Investigator:

Hongzhi Zhao

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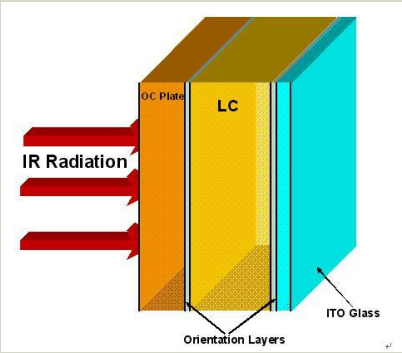
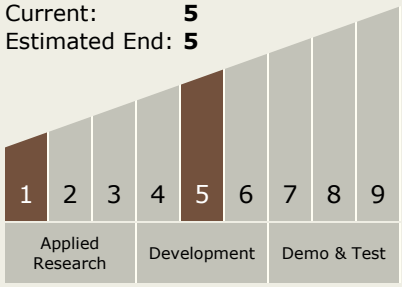
Images



Project Image
Novel near-to-mid IR imaging sensors without cooling Project Image
(https://techport.nasa.gov/image/126815)

Technology Maturity (TRL)

Start: **1**
Current: **5**
Estimated End: **5**



Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.1 Remote Sensing Instruments/Sensors
    - TX08.1.3 Optical Components

Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System